

CLAIMS

I claim the following:-

- 1) A mechanism to simultaneously transmit multiple messages in a digital broadcast system, comprising;
a multiplexor to combine one or more bits from multiple messages into a digital symbol, so each symbol has bits from multiple messages;
a DA converter, which could be comprised of a separate DA converter and an RF modulator, that converts the digital symbol into an analog symbol;
an AD converter, which could be comprised of a separate RF demodulator and AD converter, that converts the analog symbol back into a digital symbol;
a demultiplexor that recreates each message from corresponding parts of multiple digital symbols.
- 2) To increase the probability of a whole message being successfully transmitted, the mechanism of claim 1;
where the symbols transmitted by the system between the multiplexor and demultiplexor are selected from a hierarchy of non-confusable groups;
where the symbols are labelled such that each portion of the label makes a choice at a particular level of the hierarchy; and each message is transmitted using only the portion of the symbol label for each symbol that makes a choice at the same level of the hierarchy.
- 3) To increase the probability of a whole message being successfully transmitted, the method of claim 2;
where some portions of the symbol label are deliberately left unused, acting as guard bands to prevent messages using the less significant bits from interfering with messages using the more significant bits.
- 4) To increase the total data rate successfully transmitted, the method of claim 3;
where different receivers are grouped into groups with different received S/N ratios;
where transmissions to receivers in groups with lower S/N ratios are done by using the more significant bits and transmissions to receivers in groups with higher S/N ratios are done by using the less significant bits.
- 5) To increase the probability of high priority messages being received correctly, the method of claim 3;
where higher priority messages are sent using the more significant bits, and lower priority messages are sent using the less significant bits.
- 6) The means of claim 2 or 3;
where a computer determines the channel to be used by a transmitted message, and adds information to each message to allow an error check to be performed;
where another computer determines whether a message was received correctly, and maintains statistics as to the error rates for each channel used to transmit messages, and periodically communicates all or some of these statistics to the first computer;
and the first computer makes its selection at least partially based on the information provided by the second computer.

- 7) A method to extend the range of the system of claim 2 or 3 even further;
where each message is transmitted within frames delineated by at least one synchronization mark;
where messages not acknowledged as being correctly received are retransmitted in the same spot of subsequent frames;
where messages not correctly received are added to a frame channel buffer;
and where the equally significant bits of the frame channel buffer are combined to form another message.
- 8) The means of claim 1;
where the DA converter is a video graphics card;
and where the AD converter is a video capture card.
- 9) The means of claim 8;
where the data sent is spread over the pixels to be displayed by the video graphics card by software in the computer containing the video graphics card so that the output signal stays within the NTSC limits;
and where software in the computer containing the video capture card recreates the data sent by interpolating the pixels received by the video capture card.